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GEOGRAPHIC INFLUENCES IN THE DEVELOPMENT OF TEXAS

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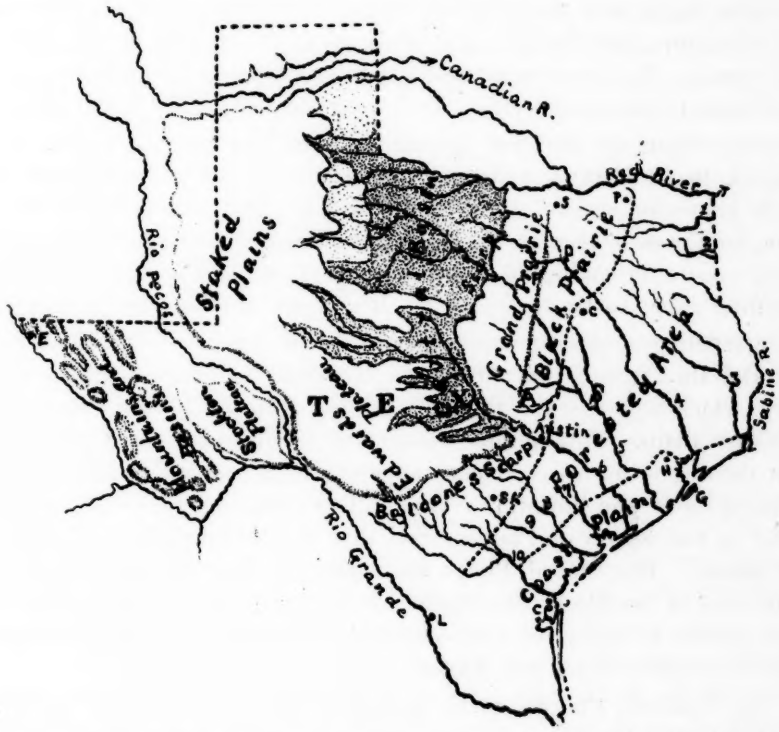
PHYSIOGRAPHIC FEATURES

IN order to understand fully the geographic influences which have prevailed in the development of Texas, it becomes necessary, first of all, briefly to treat of its salient physiographic features. The most westerly of



the Gulf states, it has a shore line approximately 375 miles in length, extending in a great crescent from the mouth of the Sabine to that of the Rio Grande. The seaboard land is low and is fortified with many long, narrow islands and peninsulas. In consequence of this the natural in-

dentations of the land are more or less closed, being, as a rule, connected with the open water by comparatively narrow and, for the most part, shallow inlets.

Skirting the coast there is a young coastal plain of varying width, say thirty miles wide on the Sabine and a hundred on the Colorado River. Sparsely wooded, and with many open and grass-covered prairies, this region is often called the "Coast Prairie." Towards the southwest the effects of an ever-increasing aridity become more and more apparent.

The approximate boundaries of the forested area are shown in the figure. In this region the rolling prairies of the south are succeeded by the topography of a dissected plateau of mild relief (500-700 ft.). Here the forest growth has been, and still is, of much importance commercially. It includes the long-leaf, the short-leaf and the loblolly pines, widely used for building purposes, as well as numerous hard wood species, such as oak, ash, hickory, etc. The effects of aridity upon the timber begin to appear southwest of the Colorado River, and in the region of the Nueces River this area blends with the so-called "chaparrel country," which is characterized by clumps and thickets of thorn-bearing plants, such as the mesquite and acasias. As a matter of geologic interest it may be stated here that the Forested Area is underlain chiefly by rocks of the Eocene Tertiary.

Succeeding the Forested Area to the west are the Black and Grand Prairies, two well-marked regions, underlain by Cretaceous strata and widely known on account of the depth and fertility of their soils. On the south, southwest and west the Grand Prairie is bounded by an inward facing scarp overlooking an area generally known as the "Central Basin," extending from Austin to beyond the Red River in Oklahoma (see figure).

Stretching somewhat south of west, from Austin to the Rio Grande near Del Rio, there is an abrupt displacement, known as the Balcones Scarp, which separates the Edwards Plateau from an inward extension of the Coast Plain. This unique topographic feature exerts a marked effect upon the vegetation as is at once apparent by a comparison of the floras of the upthrow and downthrow sides. The remainder of the State is included in the region of Plateaus and that of the Trans-Pecos Mountains and Basins. The Staked Plains are separated from the general plateau region east of the Rocky Mountains by the valley of the Canadian River. Their surface is very level, grass-covered, and marked here and there with a growth of Bear Grass and Yucca.

The Edwards Plateau, in its geological relations, is closely connected with the Grand Prairie to the east, and, although a plain when viewed as a whole, it has been trenched by deep-canyoned streams and its borders are much eroded. The third plateau area is comparatively small. It is known as the Stockton Plateau and is separated from the Edwards Plateau by the Pecos River. The larger part of Trans-Pecos Texas is includ-

ed in what has been termed the "Region of Mountains and Basins." Guadalupe Peak, just south of the Texas-New Mexico line, is the highest point in the State, having an altitude of 9500 feet. The basins of the Trans-Pecos country are plateau-like in elevation, but instead of having a relief resulting from degradation they usually present a surface covered with the erosion products of the surrounding heights.

CLIMATE AND RAINFALL

In a State embracing 265,780 square miles great variations must be expected in the amount of rainfall as well as in the other climatic conditions. In the east, there is a humid belt having an annual precipitation of from 50 to 60 inches. This includes a large part of the pine woods of the Forested Area. The adjoining belt on the west is rather broad, including the Black Prairie, a portion of the Grand Prairie, and a part of the Post Oak country to the south. Here the rainfall is from 40 to 50 inches. This is followed by a rather narrow belt, extending from the Red River to near the mouth of the Rio Grande, having a rainfall of 30 to 40 inches. Within this belt are included parts of the Grand Prairie and the Central Basin, and that portion of the coast country between the Guadalupe River and the Rio Grande. This is succeeded by a broad belt with a diminishing rainfall, varying from 20 to 30 inches, which includes the larger part of the Central Basin and the eastern portions of the plateaus. Farther west there is a very scanty rainfall—from 20 down to 10 inches. The latter amount would represent the average fall at El Paso.

RIVERS

Several distinct types of river drainage are found in Texas: (1) The Canadian, a tributary of the Arkansas River, and the Pecos, a tributary of the Rio Grande, rise in the Rocky Mountain region of New Mexico, while the Rio Grande, likewise of Rocky Mountain origin, heads in southwestern Colorado.

(2) From the Edwards Plateau flow the Nueces, its tributary, the Frio, and the Guadalupe.

(3) Some of the best known Texas rivers, the Red, the Trinity and the Brazos, have worked their way seaward from the Central Basin through the successively younger formations of a rising continent.

(4) Flowing directly into the Gulf, or united to the older and more vigorous streams as tributaries, are the rivers originating on the older portions of the Gulf slope such as Sulphur Fork of Red River, the Sabine, the Neches, the Angelina, and certain tributaries of the Brazos and Trinity.

(5) Lastly there are the streams, constituting the immature drainage of the Coast Plain, but recently established and poorly defined. Of the rivers reaching the Gulf the majority empty into coastal indentations

or bays, but the Brazos and Colorado have pushed gulfward a delta-like protrusion, as has also the Rio Grande, thus forming a delta shore line.

HISTORICAL RELATIONSHIPS

The early history of Texas is mainly that of the rival claims of the Spanish and French. The former, soon after the discovery of America, had possessed themselves of Mexico, while the latter at a much later period had established themselves near the mouth of the Mississippi. Between them stretched a wilderness, unoccupied save by the Indian, destined to become later the largest and one of the most populous states of the Union.

The Spanish claimed Texas by virtue of their early voyages; the French, by virtue of La Salle's unfortunate settlement. The latter, having descended the Mississippi, claimed in the name of the French king the lands through which it flowed. Returning to France he organized an expedition to take possession of the country. Midyear, 1684, with four ships he sailed for the mouth of the Mississippi. Entering the Gulf of Mexico, an unknown sea, the expedition which had already suffered the loss of one vessel by Spanish capture, sought vainly for the Mississippi entrance. Finally, nearing the land, it encountered the island reefs fringing the Coast Plain of Texas. Through an inlet, mistaken for a distributary of the great river, the ships endeavored to pass, a feat accomplished by two in safety while the third was wrecked. The haven thus reached is now known as Matagorda Bay, an arm of which, the present Lavaca Bay, afforded ample shelter. Having selected a suitable site a few miles above the mouth of Lavaca River, La Salle established Fort Saint Louis; though afterward destroyed by the Indians, this was the first European settlement in Texas.*

As already stated the harbors of Texas suited to the purposes of navigation are not numerous. In 1816 we find Galveston Island, now the seat of the State's greatest, and in many respects only seaport, occupied by a band of revolutionists, who had not failed to recognize the advantages of the sheltered arm of Galveston Bay. The short-lived settlement of the "Republicans" was soon followed by that of the so-called "Pirate of the Gulf," Jean La Fitte, who established here his headquarters. The present city of Galveston dates from 1837. By the construction of jetties and by dredging, deep water has been secured so that vessels of the largest size may receive and discharge their cargoes at the docks.

Second in importance is the combined port of Sabine Pass and Port Arthur on Sabine Lake. The products of the Texas-Louisiana forests had long been shipped in small vessels from Sabine Pass, but the building of a ship canal in Sabine Lake and the development of Port Arthur, four-

*G. P. Garrison, *Texas, A Contest of Civilizations, American Commonwealths*, Chapter III.

teen miles from the Gulf, is a recent achievement brought about largely by the enormous output of the Beaumont oil fields.

In 1821 stores for the first American colonists in Texas (Austin's colony) were shipped from New Orleans on the schooner "Lively" which effected a landing at the mouth of the Brazos River. Here the port of Velasco has been established and the building of jetties has given 16 feet of water on the river bar.

A breach in the chain of coastal islands, known as Aransas Pass, affords access to Corpus Christi, Rockport and the town of Aransas Pass. Point Isabel, near the mouth of the Rio Grande, is reached through an inlet—Brazos Santiago—south of Padre Island. Here the depth of water will accommodate only vessels of light draft. Formerly this pass afforded an entrance to the "Brownsville" or Lower Rio Grande country, but since the advent of railroads it is little used.

The crossing of the Texas wilderness in 1714 by the Frenchman, Saint Denis, who blazed the way of the "Old San Antonio Road," was an event of no little importance. Although his trip must be classed as a purely commercial enterprise, it opened to the world the country between the Sabine and the Rio Grande.

About this time a previous unsuccessful attempt on the part of the Spanish to establish missions was renewed. Ostensibly for the conversion of the Indian, the missions became the means of making good the Spanish claims to Texas. Some of the missions were established in the Forested Area; others in the Southwest. Of the former, practically nothing now remains; of the latter, the magnificent ruins on the San Antonio River tell of a wonderful work. Here conditions were favorable to the establishment of an industrial community. From the river and numerous springs an abundance of water was obtained for irrigation and in the mild though somewhat dry climate, stock of all kinds flourished. It was here that the Indian workmen, taught by the patient Spanish Fathers and their faithful attendants, developed much skill, not only as artisans but as farmers and stockmen as well. About one of these missions, that of San Antonio de Valero, better known as the Alamo (established in 1718), there has since developed, under the guidance of the Anglo-American, the largest city of the State, San Antonio. (Population, 96,614.)

Were this a history of Texas rather than a brief account of the physiographic influences bearing upon its development, many important details, here omitted, would be given.

Coming now to the advent of the Austins, father and son: It must be understood that, notwithstanding its great distance from the Anglo-American settlements, Texas had already attracted much attention. In 1819 Moses Austin conceived the idea of establishing a colony; the following year he journeyed to San Antonio and with difficulty gained permis-

sion to settle 300 families. The good news had scarcely been received when the elder Austin died leaving the matter of his Texas settlement in the hands of his son, Stephen F. Austin, who loyally carried out his father's wishes. Arriving at San Antonio in August, 1821, he found that Mexico had seceded from the mother country.

Austin now planned for his settlement. With a party of colonists, he arrived in the valley of the lower Brazos during the closing days of 1821. In 1823 San Felipe de Austin, on the Brazos, became the seat of government for the colony and so remained until the establishment of the Republic.

In 1825 grants of land were made to Martin de Leon, a Mexican, and to Green De Witt, an American, and both established colonies. Notwithstanding the material and political hardships of the settlers—defending their homes from savage bands on the one hand, and resisting the oppressive laws of a remote authority on the other—the net result of ten years' growth is summed up in the following sentence from a well known Texas History: "In 1820 there were not more than 4000 civilized inhabitants in Texas, while in 1830 the State boasted of 20,000 Americans alone.*

Passing the era of the Texas Revolution with its desperate struggles and unparalleled acts of heroism, passing likewise the era of the Republic, let us glance at Texas as it appeared about the time of its admission to the Union in 1845. Before me is a map by Dr. Ferd. Roemer, the first geological map of the State published. It accompanies his work on "Texas" printed at Bonn in 1849. On it are marked the old lines of travel, the ferries on the Sabine, and the older Texas towns, of which some have entirely disappeared from present day maps, others have dwindled to obscurity, and still others have become large and prosperous cities. All of the larger streams, from the Sabine to the Nueces, have their settlements. Already roads radiate in all directions from the hamlet on Buffalo Bayou—the future city of Houston—prophetic of the greatest railroad center in the State. Far up the Trinity, on the very frontier, reached by a single line of travel, Dallas is accorded a place—the germ of the North Texas metropolis, while Fort Worth is yet to be. Austin, the present capital of the State, on the north bank of the Colorado at the foot of the Balcones Scarp, occupied at this time an isolated position for the main thoroughfare, the Old San Antonio or Presidio Road crossing the river lower down at Bastrop. Corpus Christi is the most southerly town on the coast, while between the nueces and the Rio Grande no settlements appear excepting Laredo, and that is Mexican rather than Texan.

RAILROADS

The late Professor Garrison has said that one standard by which the progress of a people may be measured with substantially fair results is

*Pennybacker's *New History of Texas.*

their means of intercommunication. He had reference to railroads. It is needless to say that while some physiographic features are of the greatest importance in railroad building, others offer insuperable difficulties. In Texas the first railroad was built on the low coastal plain between Harrisburg, a few miles from Houston, and the Colorado River opposite Columbus. Today it forms a part of the transcontinental "Sunset Route" operated by the Southern Pacific Company.

It may be well to consider briefly why a transcontinental line should cross the State of Texas, especially the southern part. Railroads are not only expensive to build but expensive to operate. Of competing lines the advantage is with that having the lowest grade. Between New Orleans and Los Angeles, or San Francisco, the highest point encountered on the "Sunset Route," 5,082 feet, is at Paisano, Presidio County, Texas. In short, this line avoids the high grades of the more northern roads by a well selected southern course.

An examination of a railroad map of the State is most interesting. North of the 28th parallel and east of the 99th meridian the conditions have been most favorable for railroad building. The larger part of this area is included in the Great Coastal Slope, a region embracing the Coast Plain, the Forested Area, and the Black and Grand Prairies, geologically distinguished by the southeastern dip of the underlying strata. In the process of their development some of the railroads pushed to the north for Saint Louis and Kansas City, while others pushed to the south and southeast for the port of Galveston. Still others headed southwest seeking the Rio Grande border for Mexican or transcontinental connections. Finally the Great Plains were crossed by roads affording Colorado and New Mexico, either directly or by affiliated lines, the advantage of a deep-water port on the Gulf.

CITIES

The chief railroad centers of the State, ganglia on the map, are Houston, on the inner border of the Coast Plain, and Dallas and Fort Worth on the Black and the Grand Prairies respectively.

Through Buffalo Bayou, Houston, though fifty miles northwest of Galveston, has water connection with the Gulf and, if present plans are consummated, this water-way will soon be transformed into a ship canal, thus making the city a seaport. Already seventeen railroads center here, of which several extend to Galveston. Houston is one of the great cotton markets of the world and the seat of an important trade in lumber, rice and sugar. (Population, 78,800.)

Dallas dates from 1841. It is the commercial center of a large region, embracing parts of Texas and Oklahoma, devoted chiefly to agriculture. The adjacent prairies are noted for their fertility, producing not only cotton but large crops of wheat and corn. To Dallas has been

awarded the distinction of being the largest distributing point for agricultural implements in the Southwest. (Population, 92,104.)

Fort Worth, thirty miles west of Dallas, originated in a settlement about a military post established in 1849. For years it has been the seat of trade for the "cattle country," including not only the Panhandle but the entire plateau region between the Red River and the Pecos. Its stockyards and packing interests are the most extensive in the southwest, and considering its proximity to Dallas, its growth in the past few years has been remarkable. (Population, 73,312.)

In Texas Cotton is King. The raising of cotton in the Old South was the leading industry of the ante-bellum days. The large plantations with slave labor produced enormous crops. As the land was exhausted new areas were brought under cultivation in consequence of which the growth of cotton was extended towards the south and southwest, spreading gradually into East Texas. During the War the Old South was continually harassed by the contending armies to the great detriment of its industries, especially its agriculture. In Texas, at this time, the rigor of conflict was not so severe and cotton crops were successfully made. When the South finally emerged from the desolation of the Civil War the production of cotton in Texas had become a deeply rooted industry. The areas under cultivation continued to broaden until the rich lands of the Black and Grand Prairies became the largest producers in the State. And still the industry spread until now cotton is raised even in some of the Panhandle counties—a region heretofore considered too dry for profitable cotton growing. Thus it has come to pass that Texas is today the leading cotton producing State of the Union, its largest crop, that of 1906, exceeding four million bales.

GEOGRAPHY OF THE UNITED STATES IN THE HIGH SCHOOL

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THE question, *What is worth while?* loses none of its force by reason of its old age. It is a pertinent inquiry which every school man should keep before himself at all times. When a subject bids for admission to the curriculum it is legitimate and right to demand proof that it is worth while. In order to be worth while, it must contribute something vital to the education of citizens-to-be. This contribution may be *practical,* enabling one better to satisfy his material needs; it may be *cultural,* giving him breadth of view and greater capacity to enjoy life; or it may be *a training in methods of thinking and working,* which will enable him better to secure the practical and cultural objects.

Geography has for centuries been acknowledged to contribute sufficiently to practical and cultural needs to be entitled to an important place

in the elementary school curriculum; but it has for the most part been denied such a position in secondary schools. To be sure, physiography is a recognized subject in many high schools, but statistics show that it is losing ground. Evidently school people are doubting whether it is worth while. While maintaining that physical geography is of great value, it is the purpose of this paper to advocate in place of a detailed study of physiography a study of regional geography with a sound physiographic basis. The particular region which it is proposed to offer for study is the United States.

As to its practical usefulness, little need be said to justify such a study. Certainly, if one is to live in a country, it is eminently practical for him to learn a great deal about that country. The more he knows about the topography, climate, people, government, products, industries, transportation facilities, commerce, cities, and foreign possessions of his country, the better he is adapted to live in it, carry on his business in it, appreciate its problems, and participate in its government. Furthermore, the more mature and the better trained he is when he takes up the study, the deeper he can go into matters that are worth while and the more lasting will be the impressions made upon him. As geography is taught in most schools in this country, the United States receives its last consideration in the sixth or seventh grade; in many cases as low as the fifth grade. At this stage children are too immature to grasp at all some of the most valuable lessons which geography has to teach. Their acquisitions consist of a few facts whose bearings are little understood and include little comprehension of the nation's problems. At the high school age pupils are mature enough to study these problems profitably, if wisely guided. This implies specially trained teachers; but they will be forthcoming as soon as the need for them is established.

Not only is the study of the United States which is given in the grades too meagre, but it is in most cases given so hurriedly that the greater part of it is forgotten. High school history teachers complain that they have to teach almost as much geography as they do history, in order to make the history understood. College instructors everywhere complain of the ignorance of their students concerning the most elementary facts of geography. For example, at the University of Wisconsin 162 freshmen were examined last year in the simplest locational geography, with results that called for sackcloth and ashes. Only a very small number of these freshmen could name the states in which all of the following cities are located: Richmond, Mobile, Memphis, Butte, Syracuse, Nashville, Spokane, Atlanta, Key West, and Scranton. At the University of Pennsylvania less than ten per cent of a large geography class could write the names of all of the states in their right places on an outline map. What is the matter? It is easy to say that it is the fault of the lower schools. No doubt better teaching in the grades, embodying more intelligent and more faithful map

work would improve conditions vastly. But a careful study of the geography of the United States in the high school would reinforce the grade work at this point, so that graduates would be moderately intelligent concerning their own country, at least.

Most phases of geography study contribute as much to culture as they do to practical ends. Any study which broadens one's interests and makes him a more intelligent reader is a cultural study. Much of the periodical literature and still more of the newspaper reading of today would be utterly unintelligible without a basis of geographical knowledge. Since we live in the United States, our current literature deals largely with the country; and in order to read and talk intelligently we must be well informed about it. Surely, as a means to broader culture, the intensive study of the United States, by students mature enough to assimilate it, remember it, and apply it, is worth while.

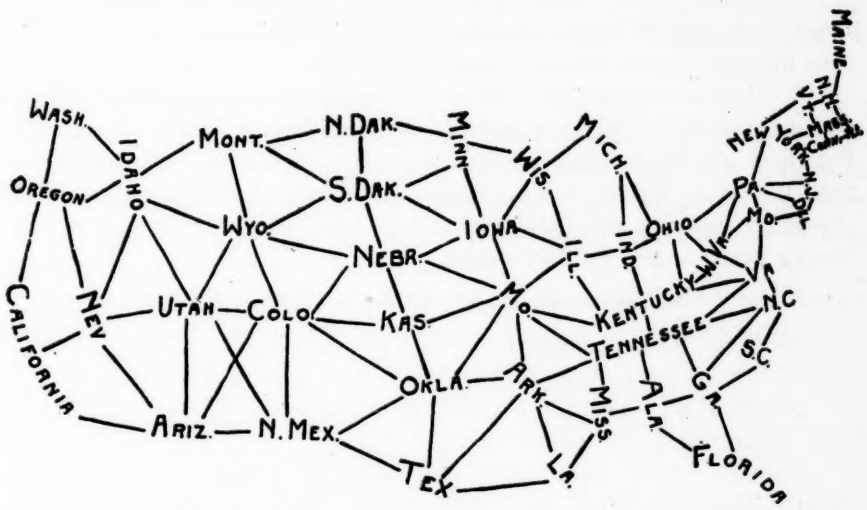
Not only does the proposed study contribute directly to practical and cultural ends, but it lends itself admirably to certain forms of training which, under the guidance of a good teacher, will give the student power for future work. Nothing more valuable than this could be given him; and excepting mathematics it is doubtful if there is a better vehicle for giving it than geography. The meaning of this statement may perhaps be gained from the suggestions as to methods, given below.

The proposition to devote part, at least, of the high school geography course to regional study, especially that of the United States, is by no means new. It has received endorsement from the National Education Association, the Association of American Geographers, and other educational bodies, and seems to have met with general approval. Nevertheless, it does not appear to have worked out in anything like a general adoption of the idea. This is most likely because of the lack of a suitable text book. In the absence of such a book, it is hoped that the following suggestions and outline, which are the outcome of practical experience, will afford a plan definite enough to encourage some teachers to make a beginning.

SUGGESTIONS AS TO METHODS

1. Begin the work by such an exhaustive map study that the positions of the states will be clearly pictured by every pupil. This is fundamental and necessary for the assimilation of the remainder of the study. The old method of bounding states is tiresome and unfruitful. Instead, try the following visual method of learning the same facts: Take one section of the country the first day, say the states adjacent to the Atlantic Ocean. With a map of the United States before him, ask the student to write down the names or abbreviations in the correct relative positions of the states, writing them parallel to the longer axes of the states. Then, preferably with a colored pencil, have him connect with lines the states

which touch each other. (See figure). This will take but a few moments, but after he has done it a few times without a map to look at, the positions of the states will be surprisingly well fixed in the student's memory. A class in first or second year high school should easily be able to do the whole country in this way in a week; and if it accomplishes the end sought it will be a week well spent.



2. Lay strong emphasis upon notebook work. Unless the students have been trained in these points by the English department or an arrangement can be made with them to co-operate, devote considerable time at the beginning of the year to instruction in methods of taking notes and making abstracts, summaries and compilations. Until a suitable textbook is published, let the work consist largely of written reports upon assigned readings in books, magazines and government publications. Here is the greatest opportunity for training. Even if the amount of geography learned seems small, the teacher should use all resources at his command to secure definiteness of knowledge, correct interpretation and classification of facts, selection of essentials, logical arrangement of material and independence of work. This training is worth more to a student than all the facts ten geography teachers could give him. Remember the famous teacher who said when asked what subject he taught, "I teach boys." If we teach geography more than we teach boys and girls, it is doubtful whether we teach geography well.

3. Use the recitation time chiefly for discussions, comparison of notes and personal criticisms. Have occasional debates, if feasible.

4. Use outline maps to record facts whenever practicable. The mental picture of the map is easier to retain in memory than the verbal statement of the facts. Use India ink and waxed crayons.

5. Make good use of government publications. Send to each of the executive departments at Washington for its list of free publications and ask the Superintendent of Documents, Washington, for his lists of geographical publications for which a charge is made. It will be necessary for each pupil to send for his own copies of government publications, as the law forbids more than one copy of each to be given to a person. Ask the Department of Commerce and Labor for a copy of the Statistical Abstract of the United States, an invaluable publication from which to secure data for plotting on maps, in graphs, etc.

6. Do not neglect the current magazines and newspapers. Make a school collection of magazine articles and bind them in heavy paper covers. Put these and the newspaper clippings in the hands of a librarian selected from the class. Secure bound volumes of the best magazines for the school library, if possible, and index the best articles unless you have a copy of *Poole's Index* or the *Readers' Index.*

OUTLINE FOR STUDY OF THE UNITED STATES

Position. Learn boundaries. Make comparisons of latitude and longitude of various parts of the country with other parts of the world.

Subdivisions. Learn the positions of the states by means of written map, as suggested in methods above.

Extent. Learn area with and without Alaska. Compare with Europe, Brazil, Australia, etc. Make maps of U. S. superposed on Europe and Asia, to show relative size.

Topography. Divide the country into topographic divisions, referring to Russel's *North America* and Powell's *Physiographic Regions of the United States.* If the class has not had physical geography, spend plenty of time on those parts of the subject which are necessary to the understanding of topography. Make a special study of the effect of topography on human activities, using Brigham's *Geographic Influences in American History* and *From Trail to Railway* and Semple's *American History and Its Geographic Conditions.* Spend a good deal of time in learning to point out on maps and locate accurately in words such of the mountains, plateaus, valleys, lakes, rivers, seas, gulfs, capes, islands, etc., as an intelligent person should know.

Climate. Unless the class has recently studied the subject, review the essentials of meteorology and astronomical geography and apply the knowledge to the climate of the United States. Discuss climatic regions. Emphasize the effects of the various climates upon man's activities.

Flora and *Fauna.* Study the life zones worked out by Dr. C. Hart Merriam in *Life Zones and Crop Zones of the United States,* published as Bulletin 10, Biological Survey, by the U. S. Department of Agriculture.

People. Plot data from the last census on outline maps. Discuss density of population in various parts of the country. Classify and discuss the Indian race. Discuss chief exotic races, habitat of each, and con-

tribution of each to the national character. Discuss briefly the Negro, Chinese, Japanese, and Hindu problems.

Religion. Statistics, only.

Education. Discuss conditions of literacy in various localities and connect with race problems. Discuss only federal institutions of learning.

Government. Organization of the government, given in brief outline only.

Defense. Discuss organization, efficiency, rank and problems of the army and navy.

Currency. Brief discussion.

Agriculture. Discussion of its relative importance and reasons therefor. Discussion of the chief crops, the reasons why grown in certain localities, markets, etc. Preparation of product maps and graphic representation of statistics. Full discussion of dry-farming, irrigation and reclamation.

Stock Raising. Discussions similar to those suggested under agriculture.

Fishing. Ditto.

Mining. Ditto.

Manufacturing. Ditto, but more full. Make use of the U. S. Census publications.

Transportation. Discussion of proposed national highways, Santa Fe Trail, etc. Full discussion of trunk line railways. Teach use of time-tables. Study interior navigation and discuss such problems as the Lakes-to-Gulf Deep Waterway. Discuss foreign shipping, harbors, trade routes, merchant marine, etc.

Commerce. General discussion of domestic commerce, including work of the Interstate Commerce Commission. Graphic representation of statistics concerning leading exports and imports and discussion of interesting points arising therefrom. Find out and explain balance of trade with principal countries. Discuss probable effect of Panama Canal upon our commerce.

Cities. Full discussion of all cities of national importance, with especial reference to reasons for their location and development. Send to boards of trade and chambers of commerce of the cities for literature and make use of geography texts, books of travel, and encyclopaedias. This work can be profitably extended as far as time permits. Learn the states in which the large cities are located.

Special studies of the states. The more important states, at least the one in which the student lives, should be separately studied. This could be done by developing an outline similar to the one given above for the study of the United States.

Special studies of the foreign possessions. This should be carefully and systematically done by means of an outline similar to the foregoing. There is ample material for several weeks' work here.

LABORATORY WORK IN PHYSIOGRAPHY IN THE CHICAGO HIGH SCHOOLS

By HARRY M. CLEM,
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IN this article an attempt is made to summarize the facts regarding the laboratory work in physiography in the high schools of Chicago. It will be difficult to make an entirely accurate statement of those facts because the courses in the high schools have been undergoing radical changes both in variety and scope, and these changes have very materially altered the course in physiography and have affected the quantity and probably the quality of the laboratory work. The efforts of the teachers to revise the course in physiography in accordance with the late rapid evolution of the subject has led to a different arrangement in the sequence of the laboratory exercises and even to the introduction of new ones. Since this new arragement of exercises is in the tentative stage a further difficulty in discussing the laboratory work arises.

The most important changes in the course of study came about in 1910 when the Board of Education made a general revision of the courses in the high schools, revising the old ones, adding a large number of new ones and changing the period of time to be devoted to most of the subjects to be incorporated. Previous to that date there were three high school courses offered, each covering a period of four years. They were: (1) a General Course, (2) a Technical Course based either on Latin or a Modern language, and (3) a Scientific Course.

Under these courses physiography was allowed 180 hours or 6 hours per week for 30 weeks, of which time two consecutive hours per week were expected to be devoted to laboratory work. Physiology, the teaching of which fell to the lot of the physiography teachers, was required of every pupil, and filled out the remaining ten weeks of the year not occupied by physiography. In the technical schools physiography was required of all pupils. In the other two courses two years of science was required, but the large majority of pupils elected physiography.

After the revisions were made the pupils entering high school in September, 1910, were confronted with an array of 21 courses instead of three from which to make their selection. Of these 21 courses, 11 covered a period of four years and the remaining ten, called "vocational courses," covered a period of two years. The following tabulated statement shows the consideration given to physiography in the new courses:

I. Four Year Courses
   a. Physiography required in first year, one semester, in the following courses: English, General, Foreign Language, Science, Manual Training.

b. Physiography or Chemistry required only in fourth year, two semesters in the Teachers' College Preparatory Course.

c. Physiography not required in the following courses: Business, Builders, Household Arts, Architectural.

II. Two Year, Vocational Courses

a. Physiography not required in the following courses: Accounting, Stenography, Mechanical Drawing, Design, Advanced Carpentry, Pattern Making, Machine Shop, Electricity, Household Arts, Printing.

In all the courses containing physiography, except the Teachers' College Preparatory, the subject has been alloted only 100 hours instead of 180, as formerly, or 5 hours per week for 20 weeks. Physiology, the running-mate of physiography, and whilom the "poor relation" of the family of science courses, but now the latest candidate as hand-maiden to general elementary science, was alotted 20 weeks of 5 hours each instead of 10 weeks of 4 hours each, as formerly, and is required in every one of the 21 new courses adopted in 1910. The physiography teachers, possessors of the classic versatility of the geography teachers, are expected to turn lightly from their physiography and teach the new courses in physiology. Only 6 of the new courses contain physiography but the subject has not been, except for time, so much encroached upon as it appears to be at a casual inspection because it occurs in the courses pursued by the great majority of pupils entering the high schools.

When the subject was so severely cut down in time, the teachers were obliged to arrange a new course of study and it was a difficult problem to compress so rich a subject into 20 weeks and provide for adequate laboratory work. A syllabus of a tentative 20-weeks course has been compiled, and a new set of laboratory exercises, simplified and written according to the new views of the subject, has been prepared by Messrs. Smith and Stahl, and Miss Sykes, and is published by D. C. Heath and Company.

The laboratory course before the revision was made was based on the Everly, Blount, Walten manual, but the present course is based upon the new manual just mentioned. A parallel arrangement of the laboratory exercises will give in the smallest possible number of words the scope and nature of the past and present courses in physiography.

Minimum course in physiography, laboratory exercises based on the Everly, Blount, Walton manual and used previous to September, 1910. (The number of the exercises in parentheses.)

A Globe Exercise (1)

Map of Standard Time (7)

Laboratory or Demostration Exercises on Work of Agents of Weathering

The Study of Minerals (10)

The Study of Rocks (11)
Demostration of Solution and Precipitation (15)
Vertical and Horizontal Rock Section of Chicago (48)
First Exercise in Contours (19)
Second Exercise in Contours (20)
The Mount Shasta Map. Land Form and Profile (40)
Development of V-Shaped Valleys, La Salle, Ill., Sheet (21)
Mature Drainage, Charleston or Savanna Sheet (33, 25)
Swamp Plain and Levee, Donaldsonville, La. (26)
Mississippi River Commission Map No. 14 (27)
Study of Glacial and Water Worn Pebbles (42)
Glaciers, Mt. Shasta Special Sheet (43)
Some Maps Showing Glacial Topography
Plateaus, Kaibab, Ariz., Sheet (37)
Appalachian Mountains, Harrisburg Sheet (38)
A Volcanic Cone, Shasta Sheet (40)
Demonstration, Making a Barometer (57)
Relative Amounts of Heat Received From the Sun (66)
Sunrise and Sunset Graphs (5)
Elementary Exercise on Isotherms (67)
Distribution of Temperature (68)
Effect of Latitude on Temperature (69)
Convection in a Gas (65)
Effect of Land and Sea on Distribution of Temperature (70)
Cyclones (Map study) (76)
Winds and Currents (map) (87)
Humidity (demonstration) (63)
Rainfall in the U. S. (map study) (77)
Rainfall and Vegetation (map study) (89)
Section across the Atlantic (82)
Boothbay, Me., sheet (85)
Atlantic City map (84)

Minimum course in physiography, laboratory exercises based on the Smith, Stahl, and Sykes manual and recommended for use with the new short course in physiography.

Expansion Due to Heat (1)
Insolation. The Heat Received From the Sun (2)
Temperature Distribution over the Earth (3)
Moisture in the Air. Humidity (6)
The Mercury Barometer and its Action (9)
Study of the Weather Map (14)
The Temperate Latitude Cyclone and Anticyclone (15)
Map of Planetary Wind Belts (11)

Winds and Currents (12)
The Local Weather (16)
Distribution of Rainfall in the United States (18)
Monthly and Seasonal Rainfall in the Climatic Regions of the United States (19)
Influence of Rainfall on Vegetation (20)
Parallels and Meridians on a Globe (21)
Parallels and Meridians on a Map of the Western Hemisphere (22)
Parallels and Meridians on a Map of the World (23)
Standard Time (24)
Delta Table Study. Work of Running Water (28)
The Mississippi and St. Lawrence River Basins (29)
Iron and Coal (31)
Contour Lines and Contour Maps (32)
Comparative Study of Contour Maps (33)
Study of Stream Erosion From a Contour Map, Highwood, Ill. (36)
Topographic Effects of Stream Erosion, Savanna, Ia., Ill. (39)
The Work of a Meandering Stream, Marshall, Mo. (40)
River Flood Plains, Donaldsonville, La. (42)
The North American Ice Sheet (43)
Glacial Topography, Whitewater, Wis., Weedsport, N. Y. (45)
Shore Lines, Atlantic City, N. J., Boothbay, Me. (48)
Effect of Erosion upon Rocks of Unequal Hardness, Harrisburg, Pa. (53)
Rugged Mountains, Platte Canyon, Col. (54)
Plateaus, Charleston, W. Va., Kaibab, Ariz. (55)
Note: At least one field trip should be taken by every class.

The amount of laboratory work required in the past, before the shorter course was instituted, was at least two hours per week for 30 weeks or a total of 60 hours, but a few teachers believe in more than that amount. At present there is no definite amount of work required but probably one hour per week will be the standard. Many teachers yielding to habits learned while teaching a more extensive laboratory course will devote more than one hour a week to that phase of the physiography work. In the past, fairly complete equipments were furnished for laboratory work in physiography. Delta tables, contour maps, wall maps, small globes, models, meteorological instruments, chemicals, etc., were sufficiently provided to enable the teacher to carry out the exercises listed above in the older course.

The teachers as a body are very much in favor of laboratory work and have no thought of abandoning it. Their conviction of its importance and training qualities is based on the facts that it is a valuable educational instrument and is liked very generally by the pupils. They are interested

in the demonstrations by the teachers and work, on the whole, so diligently at the exercises which they are required to do individually, that the teachers are led to give all the laboratory work that is compatible with the scope of the course and the time alloted to it. Teachers have spent as much as three hours on a single topographic map and the average time spent by 29 teachers who were interviewed was 65 minutes per map. The interest of the pupils has its limits, of course, and will not endure a very tedious and detailed interpretation of maps and graphs. As soon as the general idea in the graph, for example, is discussed, the pupils are ready for new conquests and, unless the teacher is persistent in his efforts at interpretation, the exercises become mere tasks in mechanical drawing. Not a great amount of laboratory work outside of the contour maps, graphs, and minerals is done individually by the pupils because of the impossibility of directing 150 to 200 enthusiastic and impulsive pupils per day; hence demonstrations are made by the teachers, to the manifest satisfaction and interest of the pupils.

Since physiography has been taught in the city only 15 years and the subject has undergone many changes, the character of the laboratory work has kept pace with the evolution of the subject. An examination of the laboratory manuals used in succession, shows a notable change in the character of the work, passing from difficult, detailed and technical exercises with pure physiography uppermost, to easy, simple exercises treated more generally and with less emphasis upon pure physiographic details, and greater attention devoted to the life relations. The Everly, Blount, Walton Manual was a great advance over the manual compiled by Frank J. Darling and other Chicago teachers, and the new manual by Smith, Stahl and Sykes is a still further advance in the way of exercises adapted to the young minds of first year high school pupils.

There has been a change in the teaching of topographic maps. They were rather overworked in the past, and were too much studied for the sake of merely reading such maps, yet they are still liberally studied in the laboratory. Not so painfully dissected as formerly, they are used to present general aspects of typical land forms. Since the life relationships of physiography are now being emphasized, the teachers are using the maps as a means of developing ideas of such relationships. The tendency is to study a much larger list of maps than formerly, to neglect tedious details and to study the maps comparatively as to general features shown and as to the the life and economic relationships. The making of cross profiles from topographic maps is out of vogue, and a very small per cent of the teachers require the pupils to make models of the region shown on the maps.

In other laboratory exercises, not much change is noticeable except probably that minerals and rocks are much more sparingly studied than formerly, or are entirely neglected. A number of the teachers are beginning to de-

vote a little more attention than formerly to the laboratory study of general maps in order to teach the geographic distribution of the physiographic elements. In reference to the laboratory exercises as a whole, there is, as mentioned above, a movement toward greater simplicity in their treatment in order to bring them down to the level of the mind of the high school freshman. The scope of the various exercises and the questions pertaining to their development look far less like university work than formerly, and in so far the subject of physiography has increased in the appreciation of the pupils, and its presentation is becoming more a pleasure than a work of exasperating labor.

ROBINSON CRUSOE—A STUDY IN THE NEW GEOGRAPHY

By C. L. MARTZOEFF,
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THE New Geography is essentially a study of relationships. The subject-material centers about man and his earthy environment. It is the account of how man, wrestling with Nature, is building his institutions. What he has done today, becomes a record tomorrow and we call it history. There is no difference between the fundamentals of geography and history, except the *time* element. Both deal with man's struggle to make a living. The purpose of history is to preserve the experiences of mankind that the new generations may begin somewhere about where the old ones left off.

The story of Robinson Crusoe lives because it expresses the fundamentals of human life. It is the story of a man, who, while adapting himself to his surroundings, succeeds in making himself their master. Had he failed, DeFoe could not have written the story. No one would read it if he had. Robinson Crusoe epitomizes in the individual the experiences of the race. The story is so familiar it hardly needs repetition. But the purpose of this article is to call attention to some things in Robinson Crusoe's experiences that fit in with the more modern conceptions of geography and its teachings.

The first night Robinson spent on the island saw him revert to the primitive man. He climbed a tree and made his bed between the forks of the limbs. He also took a short club with him to ward off any possible enemies. But in a few days, "Having now brought my mind a little to relish my condition, and giving over looking out to sea to see if I could spy a ship, giving over these things, *I began to apply myself to accommodate my way of living, and to make things as easy to me as I could.*"

Until the vessel was pushed off in a storm he brought much of the ship's material to shore. He built him a house in the face of the rock. He needed a chair and a table, so he made them. "I had never handled a

tool in my life, however, I made abundance of things with no more tools than an adz and a hatchet." He needed a light in his house, but he had no candles. However, when he killed a goat he saved the tallow, "and with a little dish made of clay, which I baked in the sun, to which I added a wick of some oakum, I made me a lamp." Some stray grains of rice and barley had accidentally fallen about his door. They sprouted and bore seed. These were carefully preserved and planted. After some experimenting, "I was made master of my business and knew exactly when was the proper season to sow, and that I might expect two seed-times and two harvests each year." His tools became dull. He had a grind-stone, but not having a boy with him to turn it, it was necessary to contrive a plan by which he could use his foot. Had Friday been with him at this stage of the drama, Robinson would have been saved this trouble, but it would have militated against DeFoe's story.

Ten months of "being monarch of all I survey," was sufficient to develop in our hero the idea of more worlds to conquer. So, "having now secured my habitation, I had a great desire to make more perfect discovery of the island and to see what other productions I might find, which I yet knew nothing of." On this exploring expedition he found "melons upon the ground in great abundance and grapes upon the trees, * * * very rich and ripe." These he cured and dried in the sun and stored for use in the rainy season. There were also green limes, the juice of which mixed with water made "a very wholesome, cool and refreshing drink." He needed a basket. He found the twigs he used were too brittle, but by dint of search he found at last a wood to answer the purpose. Soon he had a sufficient supply and "afterwards I took care never to be without them." When he came to reap his grain he used a cutlass for a sickle. He had no plow to turn up the earth; "Well, this I *conquered* by making a wooden spade." "When the corn was sowed I had no harrow, but was forced to drag a great heavy bough of a tree over it to scratch it."

He needed some earthen vessels sorely. "It would make the reader pity me, or rather laugh at me, to tell how many awkward ways I took to raise this paste, what odd misshapen ugly things I made, how many of them fell in, and how many fell out." But by accident he found that he could burn the clay. So taking his vessels, he piled wood about them and remained up all night to tend the fire. "In the morning I had three very good, I will not say handsome, pipkins and two other earthen pots, as hard burnt as could be desired."

Now that he could raise grain, he had to arrange some method of crushing it. He could not find a suitable stone, so a block of hard wood was substituted and used as a mortar. For a pestle, a piece of ironwood served very well. To separate the bran from the flour a sieve made from some old muslin was desired. To make an oven was his next task. A

pavement of burnt tile was made very hot. The embers were swept off, the dough placed on the tile and covered with one of his earthen vessels, around which the live coals were piled. "Thus, as well as in the best oven in the world, I baked my barley loaves." He needed a boat. By dint of hard labor he succeeded in gouging one out of a cedar log, but it was too unwieldy and heavy and he could not launch it alone, so he made a smaller one.

"It was in the sixth year of my *reign,* or my *captivity,* whichever you please." What *shall* we call it? "Accordingly, the next day I came provided with six large candles of my own making, for I made very good candles now of goat's tallow." A decided improvement over the spluttering tallow-dip.

At the end of eleven years, he found his ammunition growing low. To meet his environment he again reverted toward the primitive types. He would snare his game. But the goats were wary and he might not always succeed. But he could domesticate them and he did. "In about a year and a half I had a flock of about twelve goats, and in two years more I had three-and-forty. I not only had goat's flesh to feed on, but milk too! For now I set up my dairy and had sometimes a gallon or two of milk in a day. After a great many essays and miscarriages, I made me both butter and cheese."

When Friday came, the community life began, for Friday was soon taught to work.

When Crusoe left the island in the hands of the ship's crew, who had concluded to stay, he gave them the whole history of the place. "Showed them my fortifications, the way I made my bread, planted my corn, cured my grapes, and in a word, all that was necessary to make them easy."

On his return to his colony he found it had increased materially in numbers. Among the new colonists were some barbarians. "Our men taught them both to plant corn, make bread, breed tame goats and milk them. They wanted nothing but wives, and they would soon become a nation." "Our men taught them to make wooden spades, to make wicker-work or baskets; but they soon out-did their masters. They came at last to build up their huts very handsomely, so that when I came to see them, they looked at a distance as if they lived all like bees in a hive." Some women had come to the island and the "wedding bells rang out." Homes were now established and all that was needed was a government.

Robinson Crusoe, as lord proprietor of the colony, gave them their charter. "I told them I was not capable of giving them better rules than they were able to give themselves, (Democracy), only made them promise me to live in love and good neighborhood with one another." (The Golden **Rule).**

THE STATUS OF GEOGRAPHY IN THE MINNESOTA HIGH SCHOOLS

By C. E. HUFF,
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THE following questionaire was recently sent to the Superintendents of the Minnesota High Schools, asking for data and opinions relative to the status of high school geography. Seventy-six replies were received. These answers may be taken as representative of the conditions in the entire state. All the larger cities outside the Twin Cities replied, as did also a large number of smaller cities and towns in agricultural communities.

SUPERINTENDENTS' QUESTIONAIRE

1. What courses in geography are now offered in your high school?
Physical geography, number of months?
Political geography, number of months?
Commercial geography, number of months?
Other courses?

2. During what year in the course is each subject taught?

3. Is physical geography offered as a beginning science, or after other sciences have been studied?

4. To the average pupil, what is the relative importance of physical geography, as compared with other high school sciences?

5. What should be the purpose of the course in high school geography?

6. Of what practical value is geography in the high school?

7. All things considered, is the subject of sufficient importance to entitle it to a place in the agricultural and other industrial courses?

8. Considering the physical features and local industries of Minnesota, what phases of geography should receive special emphasis in the high school?

9. Are teachers given the same relative opportunity as to equipment and time for field and laboratory exercises as in other sciences?

10. In the past, have you found teachers as well prepared to carry on such exercises as teachers of other sciences are to do successful laboratory work?

11. From the pupil's standpoint, are you getting as satisfactory results from physical geography as from the same amount of time given to other sciences?

12. In what ways do you consider our present-day teaching of geography in high school weak?

13. What, in your opinion, is the principal weakness of the present-day physical and commercial geography texts?

14. Has your teacher of geography in the high school had the same amount of special training in geography as he has in the other subjects he teaches?

15. Has he had the same amount of training in geography that other science teachers have had in the sciences they teach?

16. If you consider the training of the present-day geography teachers inadequate, please suggest what you think might be done to bring about better training in the near future.

17. If you attribute present weaknesses to other causes, please suggest how you think the weaknesses might be eradicated.

SUMMARY OF ANSWERS RECEIVED

Of the 61 answering the first question:

57 schools offer physiography ½ year.
4 schools offer a full year's work.
9 schools offer political geography ½ year.
3 schools offer commercial geography 1 year.
47 schools offer commercial geography ½ year.
7 schools offer only commercial geography.

Of the 61 answering questions 2 and 3:

43 offer the work as a beginning science during the first or second high school year.
18 offer the work during the third or fourth year after other sciences have been taken by the student.

Of the 58 answers to question 4:

33 state that pupils taking physical geography consider it of very small importance as compared with other sciences.
10 state that pupils consider it at least as important as other subjects.
15 misinterpreted the question. In these 15 the superintendent states that he considers it on a par with other sciences.

The following quotations from various letters indicate the general attitude of pupils toward the subject as now taught:

"a snap," "a filler," "inferior," "of little interest," "an odd end."

The answers to question 5 which had to do with the purpose of courses in high school geography, cannot be summarized numerically. Opinions were variously stated. Yet there is a uniformity of idea which may be expressed by quoting and connecting various answers: "The student's eyes should be opened to the world about him; he should learn in his geography study constantly to observe and reason." By the aid of the teacher and the text the student should learn to "discover for himself the influence of physical environment upon life and industries." He should reason out problems in accordance with natural laws and principles much as he would solve problems in physics and chemistry. "The aim should be to make the student realize that while many other than geographic in-

fluences affect life, yet the geographic forces and agencies have fashioned and are now fashioning his place of habitation and occupation, that practically all industries are conditioned by and based upon geographic facts, that the whole past of the human race has been a tough struggle with geographic facts," and that, "geography is the background of the study of literature, history and economics" as well as of all the other sciences and of the industries.

Of the 66 answering question 7:

56 answer that geography, especially physical geography, should be a part of all industrial courses.

10 say there is no time for it and that it should not form a part of such courses.

2 say that physical geography should be omitted and only commercial offered.

Such emphatic statements as the following are suggestive: "absolutely necessary in an industrial course;" "yes, emphatically," "yes, if made a study of real things and not a text study only."

It is not easy to classify answers to question 8, which called for an opinion as to what should be emphasized in the high school geography.

22 state that the study of weathering, erosion and soils is of first importance.

7 mention waterways and drainage.

5 mention a study of local features and their relation to industries and life.

4 mention an elementary study of typical minerals.

3 say that soil areas, clay, sand and gravel deposits should receive more attention.

5 speak of weather and climate as very important.

10 call for a more careful relating of physical environment to life and industries.

Of the 65 answers to question 9:

13 say that teachers are given the same opportunity as to time and equipment for field and laboratory work as in other sciences.

52 say they are not given the same equipment and time.

A few typical answers may be enlightening:

"Equipment not so good because teachers have not asked for it."

"No, sorry to say, they do not want it."

"No, but teachers do not know what constitutes equipment."

"Have known only two strong teachers of geography in ten years."

"No, teachers would be at sea, not knowing how to use apparatus."

Of the 63 answers to question 10:

4 say they have been able to secure teachers as well prepared to do field and laboratory work as teachers of other sciences are to do successful laboratory work in other sciences.

59 state that they have not been able to secure geography teachers thus equipped.

Of the 58 answers to question 11:

32 say they are getting as satisfactory results from physical geography as from the *same amount of time* given to other sciences.

26 say they are not getting as good results.

Several modify these statements by saying that they do not get as satisfactory results, largely because students and teachers do not give as much time daily to physical geography as to other sciences.

Of the 63 answering question 12:

21 state that our high school geography teaching is weak because teachers are not prepared to teach the subject.

29 attribute the weakness to poor methods, and to lack of proper field and laboratory exercises, which results in a slavish use of textbooks.

In reality these two sets of answers are identical in meaning, hence

60 state that the weakness is due to the fact that they can't get teachers who are prepared to teach the subject.

A number of the secondary reasons for weakness are interesting:

"Work too advanced."

"Too little time given to it."

"Too much attempted, too little done."

"Lack of equipment."

"Too abstract."

"Subject not vitalized and related to life, industrial and trade facilities."

"Too few men teachers of the subject."

"Too much text."

"Too much mere memory."

"Not enough work to warrant employing a special teacher."

Subject a "snap."

Subject a "filler."

Of the 31 answers to question 13:

8 state that texts are weak in that they do not provide suitable laboratory and field exercises.

9 say that the texts include too many topics in outline, and develop none of them thoroughly enough.

10 say texts give too little attention to the way man has responded to his environment.

8 suggest that texts are too vague and theoretical.

Of the 58 answering question 14:

11 say their teacher of geography in the high school has had as much special training in geography as he has in other subjects he teaches.

47 say he has not had as much training in geography as in other subjects he teaches.

To quote, several say:

"We can't get such teachers."

Of the 49 answers to question 15:

8 state that their geography teachers have had as much special training in geography as other science teachers have had in their respective sciences.

41 say they have not had the same amount of training as other science teachers.

Of the 40 answers to question 16:

26 say that teachers properly trained to teach high school geography can be secured only from the college or training schools offering a special course for this purpose.

Many such statements as the following are found among the answers:

"Colleges must rank this subject as at least on a par with other sciences."

"The College of Education should be asked to offer suitable courses."

4 say, "Place the subject on par with other high school subjects."

Other answers cannot be classified. They follow:

"Raise the requirements of teachers."

"Correlate with other high school subjects."

"Activity by the Geographic Society of Minnesota should remedy the condition."

"Some one should issue an outline of the subject, with a field and laboratory manual specially adapted to the work in Minnesota high schools."

"Educate Boards of Education and superintendents to needs."

"Urgent call by superintendents would improve the conditions."

"A strenuous marking of papers in the state High School Board examinations would open the eyes of the teachers."

CONCLUSIONS

Physical Geography should be given as prominent a place in the High School curriculum as other sciences. Commercial geography should also occupy a place of prominence.

93 per cent. of the schools reporting offer one-half year's work in physical geography.

70 per cent. of the schools offer it as a beginning science. If this condition is to prevail and yet the subject hold as important a place in the course as opinions expressed indicate it should, much vague, unrelated material now presented will need to be eliminated or rearranged, and an orderly development of topics offered by inductive methods instead. If offered in the early years of the high school, the presentation must not

assume a knowledge of other sciences. A more thorough and scientific presentation of physiography could be made if offered during the later years of the high school course. Many topics do not appeal to the younger, less trained mind as they would in later years. Principles mastered in other sciences are of material value in making a thorough presentation of certain topics. But not all the sciences can be offered in the later years, hence in many schools certain topics might better be eliminated and others developed and elaborated with more care. Many of the underlying principles should be worked out experimentally, even if in so doing one seemed to infringe upon fields of physics or chemistry.

As a basis of much of the later work, physiography is of sufficient importance to entitle it to a full year in the course. However, if this seems an unreasonable amount of time to devote to it, the wise teacher must select the more important topics, and omit others. Those selected, he will develop much more thoroughly than is done in the average text-book.

With possibly a dozen exceptions, *there are no geography teachers in Minnesota* in the sense that there are physics and chemistry teachers. There are those who hear recitations in the subject, but they do not teach it. It is shown by the testimony of teachers and superintendents, by observation and by the results of the State examinations, that in physiography the work has been very superficially performed in the past, and it would seem that unless some means can be devised by which the subject can be presented by more up-to-date methods, and by more specially trained teachers, it might better be dropped from most of the high school courses. No subject is worth much as "a snap," "a filler," or "an odd end."

However, the subject can be trimmed and so recast as to be a very important part of the high school course. If the same care is used as in other subjects, teachers, who can combine this with other subjects and do as good work in other subjects, will soon be available.

85 per cent. of those replying state that physiography should be offered in every industrial course. In an agricultural community, however, the phases which would appeal to the student, and which would be most profitable for detailed study, would evidently be different from those selected for detailed study in either a mining or an industrial community. Here it would seem, there is apt to be a growing demand for physiography teachers who not only can teach well, but who are so thoroughly familiar with materials and methods that they can adapt the work to individual or community needs.

There is evidently need of improvement in equipment, but this will readily come to those who can give value received in results.

An urgent call for the preparation of teachers is indicated by the fact that 95 per cent. of those reporting state that they cannot get teachers who are prepared to do satisfactory work in geography. Whether or not

all schools would be ready to employ such a specially trained teacher at once does not matter. As the preparation must necessarily come somewhat gradually, the schools will, one by one, come to a realization of their need. This call seems the more urgent when it is noted that of the forty superintendents offering suggestions as to remedies, twenty-six suggest specifically that the college or university should be asked to provide courses which would insure as thorough preparation in this subject as in other sciences.

In fact the whole problem seems to be one relating to the teacher. Opinion indicates that physiography is not only a fit subject for the high school, but a necessary subject. Why it has been a failure as a high school subject up to the present time, is difficult to answer, unless it be that, except in rare instances, *it has been entrusted to teachers who are in no way prepared to treat it as a science.* One can scarcely understand for instance how a thoroughly trained teacher could develop such a topic as the work of running water without familiarizing one's students with the great rivers of the earth; their names and locations; their characteristics, similarities and differences; their work; their valley plains and their relation to the life, industries and population centers of that part of the world in which they are located. And though these are not found in the text, the teacher of superior knowledge will see the subject from so broad a perspective that they will of necessity link themselves with principles presented in the text and discussed by the class. The same should also be true of every topic discussed. Moreover, it is evident that such a presentation will necessitate *daily* use of globes and physical maps during both the recitation and study periods.

Since there seems to be such uniformity of opinion as to the value of geography, it is difficult to understand why schools have not long ago insisted upon teachers of better preparation. Such insistance will soon show whether physiography is to take its place with other science or be dropped from high school courses.

COLLEGE STUDENTS' KNOWLEDGE OF GEOGRAPHY

THE following ten questions were giveen a class of students at the University of Wisconsin before they commenced a course in college geography. The examination is based upon no college work, but was designed to determine how much geography the students had retained from the grammar school course, and from reading the newspapers, taking history and economics courses, etc. The examination was taken by 128 students, 42 per cent. of them above the freshman class.

These were the questions:—

1. On an outline map with state boundaries write the names of the states in the United States. (5 minutes).

2. What countries would you pass through (a) in a journey due west from Madison around the world; (b) due south and then back via the Antipodes?
3. Name four countries bordering on Switzerland.
4. Name two seas bordering on Turkey.
5. Name an island of (a) the Philippines, (b) the Hawaiian group, (c) the Antilles.
6. (a) What country produces the most coffee; (b) cotton; (c) wool?
7. In what part of the world is a place having longitude 90° west, and latitude 43° north; latitude 92° south and longitude 186° west?
8. Under what sovereignty are (a) Poland, (b) the Holy Land, (c) Finland, (d) Corsica, (e) Java, (f) Tibet, (g) New Zealand, (h) the Sahara, (i) Cape Horn, (j) Greenland?
9. Where and what are (1) Little Rock, (2) El Paso, (3) Teheran, (4) Manchuria, (5) Volga, (6) Siam, (7) Brussels, (8) Tripoli, (9) Selkirks, (10) Caspian?
10. (a) In what direction from the Atlantic entrance to the Panama Canal is the Pacific entrance? (b) in what direction from the north pole is Alaska? (c) in what direction from this room does the compass point? (d) in what direction would the trade wind blow in the northern hemisphere if the sun rose in the west?

The highest mark obtained was 87 per cent.; the lowest was 28 per cent. The marks received are summarized below.

Grade in examination	Number of students	Percentage of class
90 — 100	0	0
80 — 89	5	4
70 — 79	20	16
60 — 69	31	24
50 — 59	35	27
40 — 49	30	24
30 — 39	6	4
20 — 29	1	7-10

L. M.

NEWS NOTES

With Professor E. M. Lehnerts as President of the Minnesota Geographical Society, the organization has recently taken on a new life. It has for its purpose the accumulation and distribution of geographical knowledge with particular reference to Minnesota. The society holds at

least one large meeting each year, at which time one or more men, who stand high in their particular subject, lecture.

The lectures, which are based upon pedagogical methods, travel, general and local regions, and upon the industries, are meant to be inspirational as well as informational. Much good is also gained at these meetings from informal discussions of new methods and problems which come so frequently into the experience of individual members. Many of the active members live in or near the Twin Cities, and get together frequently in an informal way for the benefit of personal contact, discussion and field trips.

The work is being thoroughly organized, and so divided among interested committees that, without being a burden to anyone, much value to the general subject of Geography within the state is being accomplished.

Columbia University has established an Associate Professorship in Physiography, and has called to this position Dr. D. W. Johnson, now Assistant Professor of Physiography at Harvard University. Professor Johnson begins his work at Columbia in July, where he will give one course on "Physical Geography and its Economic Aspects," and another on "The Physiography of the United States."

RECENT PUBLICATIONS

THE ATLAS PHOTOGRAPHIQUE DES FORMES DU RELIEF TERRESTRE. Edited by J. Brunhes, E. Chaix and Emm. de Martonne, Geneva, Switzerland.

The detailed announcement of the Atlas Photographique des Formes du Relief Terrestre is an event of unusual interest to all teachers of physical geography and geology. This atlas is published under the editorship of the eminent geographers mentioned above, with the assistance of an advisory committee of which Professors Davis of Harvard, Tarr of Cornell, and Atwood of Chicago are the American members.

The atlas will consist of illustrations of land forms according to the following grouping: forms due to disintegration; to erosion by running water; to nature of the rocks; to geological structure; glacial forms, eolian forms, shore forms, and volcanic forms.

Each sheet devoted to one sub-topic, includes a splendidly reproduced illustration, a schematic plan localizing the details of the illustration, and a description of the features in a simple but accurate form.

The preliminary prospectus indicates the quality of the work and shows that the atlas will be a necessary aid to all teachers of physical geography. Further information may be secured from the publishers, Fred Boissonas et Cie., Geneva, Switzerland. R. E. D.

MODERN GEOGRAPHY. By Marion I. Newbigin, Editor of the Scottish Geographical Magazine. 256 pp. nine chapters. New York, 1911. Henry Holt & Co. 75 cents net.

This little volume is No. 7 in the Home University Library of Modern Knowledge. It is in no way like our school text books, having few illustrations and only an occasional sketch map. From the title of the series, "Home University Library," one infers that the book is designed for mature readers. It is well suited to such use, and it will prove a decidedly helpful supplementary book in the schools. Much that it contains is found in our secondary school text books. On the other hand, there is an emphasis upon relationships and upon the influence of environment that entitles the book to be called *Modern Geography*. Into this relatively new field of geographic influences, the little volume brings a multitude of illustrations. Any student or teacher who is looking for a compact discussion of geographic relationships will find it in this book.

R. H. W.

TRIBUTE TO PROFESSOR TARR BY HIS FORMER STUDENTS, NOW IN WASHINGTON, D. C.

AS Cornellians and former students of Professor Ralph Stockman Tarr we learn with sorrow of his death and extend to his family our heartfelt sympathy and condolence.

We feel keenly the loss to the University of his unselfish service and forceful personality, and we regret that his brilliant contributions to geology and geography have been cut off at a time when they were most fruitful and convincing.

Above all we deplore the loss of the personal influence which we have found so helpful and inspiring in his home, in the class room, and in the field. Those of us who have known him under the trying conditions of life in northern ice fields, where no hardship was too great to be cheerfully borne, can most fully appreciate his devotion to the science he loved and the fineness and strength of his character.

Geo. H. Ashley	J. C. Hoyt
V. H. Barnett	L. O. Howard
J. A. Bonsteel	E. M. Kindle
B. S. Butler	G. C. Martin
F. K. Cameron	G. C. Matson
M. E. Evans	E. S. Sheperd
L. C. Graton	C. W. Turrentine
R. T. Hill	David White
J. A. Holmes	Washington, D. C., March 22, 1912.

GEOGRAPHICAL TEACHING IN GERMAN SCHOOLS

THE German Association called the Geographentag, has, according to the *Zeitschrift d. Gesellschaft f. Erdkunde zu Berlin,* been considering methods of reforming geographical teaching in the higher schools of Germany. The members of the association are of opinion that the present teaching does not allow sufficiently for the great strides which Germany has made of recent years, especially in trade and industry. They think that her future citizens should be so trained that they can appreciate the influence which geographical conditions have upon trade and upon national development, and may be fitted to face the great problems of the future. If the German colonies are to be developed as they ought to be, the German people must have a wider knowledge of geography than at present.

In order to promote these ends both general and detailed syllabuses are given, but these do not seem to contain anything particularly novel. It is, however, of interest to note the conclusions arrived at in regard to the training of the teachers. It is recommended that teachers of the subject should be specially trained, and should study geography during several years. Mere book work is regarded as insufficient, and excursions and practical work should form an essential part of the course. This practical work should be sufficient to render the teacher competent to lead similar excursions afterwards as part of the school work, and to instruct his class in simple methods of mapping, etc. As regards the interesting question as to the faculty with which geography is to be associated in the University, the resolutions of the Geographentag allow considerable latitude, but they recommend that the following should be optional subjects, with which geography may be associated for examination purposes:— (1) History, (2) Mathematics and Physics, (3) Geology and Biology. But they add that when geography is taken together with a literary subject such as history, the students should have strongly urged upon them the necessity for adding some practical study of geology to their course. "Without geological and climatological knowledge scarcely one branch of geography can be pursued with profit." The frequent association of history with Geography is regarded largely as a matter of school convenience, rather than as an indication of affinity between the two subjects.

The above is of interest as showing that the problems which confront geographical teaching in Germany are much the same as those we have before us here.